

EXPENDITURE RECORD

AUTHORIZATION NO. DED-1048
 EST. COST: MATERIAL _____
 LABOR _____
 OUTSIDE EXPENDITURE _____
 TOTAL \$1500.00

PL
FL

D. M. Demarest

DETAIL OF EXPENDITURE AND WORK TO BE DONE

laboratory 100 centimeter sphere
 good. At present the treated
 we are realizing only 50% of

the spheres using porcelain will have the following advantages.

- 1) High humidity or moisture will not effect the usefulness of the spheres.
- 2) Will extend the useful range of the 100 centimeter spheres
- 3) Sphere gap supports will be easier to keep clean.
- 4) All parts will be made in our own plant and so avoid material scarcity and priorities.
- 5) Will present another example of high voltage porcelain at work.

Mr. Bettini please provide sample rods as requested by D. M. Demarest

DATE OR REFER.	LABOR	MATERIAL OR PURCHASES	DATE OR REFER.	LABOR	MATERIAL OR PURCHASES	DATE OR REFER.	LABOR	MATERIAL OR PURCHASES

Eng. Dept. - 2
 Budgetary Control
 Mr. Demarest

GAUER

[Signature]
 ISSUED BY:

MR BETTINI
 MR STEINBACH

APPROVED BY: *[Signature]*
[Signature]
[Signature]

EXPENDITURE RECORD

AUTHORIZATION NO. DED-1048
EST. COST: MATERIAL _____
LABOR _____
OUTSIDE EXPENDITURE _____
TOTAL \$1500.00

PLEASE AUTHORIZE THE FOLLOWING: (SHOW IN BODY COMPLETE DETAIL OF EXPENDITURE AND WORK TO BE DONE)
PLEASE DO THE FOLLOWING WORK:

This is to cover the cost of rebuilding the laboratory 100 centimeter sphere gaps using porcelain tubes instead of treated wood. At present the treated wood in the sphere gaps has deteriorated where we are realizing only 50% of the rating of the spheres.

Rebuilding the spheres using porcelain will have the following advantages.

- 1) High humidity or moisture will not effect the usefulness of the spheres.
- 2) Will extend the useful range of the 100 centimeter spheres
- 3) Sphere gap supports will be easier to keep clean.
- 4) All parts will be made in our own plant and so avoid material scarcity and priorities.
- 5) Will present another example of high voltage porcelain at work.

Mr. Bettini please provide sample rods as requested by D. M. Demarest

DATE OR REFER.	LABOR	MATERIAL OR PURCHASES	DATE OR REFER.	LABOR	MATERIAL OR PURCHASES	DATE OR REFER.	LABOR	MATERIAL OR PURCHASES

Eng. Dept. - 2
Budgetary Control
Mr. Demarest

GAUER

ISSUED BY: *[Signature]*

MR BETTINI
MR STEINBACH

APPROVED BY: *[Signature]*

[Signature]

25, 1951.

AUTHORIZATION NO. DED-1048-1
EST. COST: MATERIAL _____
LABOR _____
OUTSIDE EXPENDITURE _____
TOTAL _____

PLEASE AUTHORIZE THE FOLLOWING: (SHOW IN BODY COMPLETE DETAIL OF EXPENDITURE AND WORK TO BE DONE)
PLEASE DO THE FOLLOWING WORK:

This supplement is written to cover the material to be made.

Mr. Bettini please make the following:

	Quantity Good	Drawing	Part No.
a)	2	VM-57904-A	57904-A
b)	1	VM-57904-A	57904-A1
c)	2	UM-57904-B	57904-B

Mr. Hill: Please fabricate the following:

a) 2 steel adapters galvanized as per drawing UM-59904-F.

Note: Holes to be drilled in these adapters will be marked on the job and returned to the Machine Shop for Drilling.

Production: 2 drawing No. 90244 M.I. flanges will be required.

Mr. Shamberger: Please assemble parts 57904-A as per drawing No. 57904-AZ.

Refer to Mr. Demarest for ^{any} further details.

DATE OR REFER.	LABOR	MATERIAL OR PURCHASES	DATE OR REFER.	LABOR	MATERIAL OR PURCHASES	DATE OR REFER.	LABOR	MATERIAL OR PURCHASES

Eng. Dept. (3)	Mr. Biddinger	Prod. Dept (3)	Mr. Bladden
Budgetary Control	Mr. Bolesta	Mr. Mytke	Mr. Steinbach
Mr. Demarest	Mr. Shamberger	Disp. 2A	Mr. Gauer
Mr. Bettini (2)	Mr. H. Hill	Disp. 3	APPROVED BY:
Mr. Alcott	Mr. Patten	Disp. 4	BT File (3)
Mr. Neil	Mr. Herchenhan	Payroll	

AUTHORIZATION NO. DED-1048-1
EST. COST: MATERIAL _____
LABOR _____
OUTSIDE EXPENDITURE _____
TOTAL _____

THE FOLLOWING: (SHOW IN BODY COMPLETE DETAIL OF EXPENDITURE AND WORK TO BE DONE)
THE FOLLOWING WORK:

Mr. Patten: Please schedule
Mr. Bettini: Please follow

(a) 57904-A (F-740) (S) - Porc. 3-Q
4-1/2" x 7" x 158" (1/8 scale)
Fire 12 - Periodic kiln (Ring-Special)

1 - DW Pug B-1
D.W. Turn in Trough
2 - DW Shrink on head
3 - DW Polish Head
4 - DW Fin Cpt - Insp - Glaze GB-1
5 - DW Fire Inspect FI-1
6 - DW Cut off and grind cpt. GR-3

(b) 57904-A-1 (F-740) (NS) Porc. 3Q
4-1/2" x 7" x 149" (1/8 scale)
Fire - 12 - Periodic kiln (Ring-Special)

1 - DW Pug B-1
D.W. Turn in Trough
2 - DW Shrink on Head
3 - DW Polish head
4 - DW Fin Cpt - Insp - Glaze GB-1
5 - DW Fire Inspect FI-1
6 - DW Cut off and grind GR-3

(c) Mr. Bettini: (57904-B)
Please make in Pilot Shop

Production Dept.:

Order 2 castings 90244 M.I. flanges.

Mr. Neil: Please machine, drill and galvanize

DATE OR REFER.	LABOR	MATERIAL OR PURCHASES	DATE OR REFER.	LABOR	MATERIAL OR PURCHASES	DATE OR REFER.	LABOR	MATERIAL PURCHASES

see page 1

ISSUED BY: *H. L. Lewis*

APPROVED BY: _____

WICKS INCORPORATED ORDER AND EXPENDITURE RECORD

Page 3
 DED-1048-1

AUTHORIZATION NO. _____
 EST. COST: MATERIAL _____
 LABOR _____
 OUTSIDE EXPENDITURE _____
 TOTAL _____

FOLLOWING: (SHOW IN BODY COMPLETE DETAIL OF EXPENDITURE AND WORK TO BE DONE)
 WORK:

Mr. Hill: Please make 57904-F and send to Neil for galvanizing.
 Mr. Shamberger: Please assemble per Mr. Demarest's instructions.
 Payroll: For this order pay D.W. for all work.
 Mr. Alcott: Please furnish Mr. Bettini any assistance necessary to produce his part of this order.

DATE OR REFER.	LABOR	MATERIAL OR PURCHASES	DATE OR REFER.	LABOR	MATERIAL OR PURCHASES	DATE OR REFER.	LABOR	MATERIAL PURCHASES

See page 1

ISSUED BY: _____
 APPROVED BY: _____

COST AND DELIVERY ESTIMATE SHEET

Quotation No.

3847

Drawing No. 7

252 8/5/57

PROCESS IMMEDIATELY

Customer

Job

Quantity

Description.

Remarks

Sheet R-2820 9/18/57.

[illegible]

Engineer *J. J. J.* Date *8/16/57*
 Assembled *J. J. J.*

Porcelain				Hardware				Assembly			
	Weight	Work Station	Hours Per M	Cost Per M		Weight	Work Station	Hours Per M	Cost Per M		Cost Per M
Operations					Operations					Operations	
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											
11.											
12.											
Total											
Pe-su											
Total Direct Labor											
Overhead											
Clay											
Firing											
Galvanize											
Hardware Material											
Total											
Kiln Loss											
Total											

Total	
Equipment needed and estimated cost	Initials of Cost Man
<u>Delivery Estimate</u>	Initials Date
Hardware	
Porcelain	
Assembly	
Equipment	

Distribution:
 Planning Dept.
 Cost Dept.
 Engineering Dept.
 Quotation File

S-302-adv.

Baltimore, September 11, 1951
(Dict. 9/10/51)

Dr. H. Rudoff
Materials & Process Division
General Engineering Lab
General Electric Company
Schenectady, New York

On a recent trip to Locke you discussed the possibilities of our using some of your epoxy resin for making bonds between porcelain surfaces. The attached sketch shows a proposed bond that we would like to make. For this application it would be desirable to make a bond between a glazed and unglazed section of porcelain capable of withstanding moderate cantilever loads.

Other desirable features would be as follows:-

- 1- Low thermo setting temperature.
- 2- Bonding material should have a dielectric constant of about 4 or 5.

We are thinking of incorporating this bond in a design of a high voltage structure which is of such a nature as to make it desirable to eliminate all metal fittings. Perhaps some of these epoxy resin would do the job.

D. M. DEMAREST
Supervisor of High Voltage Laboratory

DMD/bm

GENERAL ENGINEERING LABORATORY
GENERAL  ELECTRIC

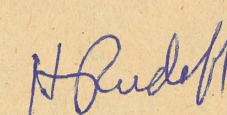
SUBJECT: Porcelain to Porcelain Bond

Schenectady, September 28, 1951

Mr. D. M. Demarest
Locke Department
BALTIMORE, MD.

We feel quite confident that a bond can be made in the assembly that you sketched for us under USK-9-10-51. The epoxy resin involved has a dielectric constant of four (4) which presumably meets your requirements.

Further specifications of the setting temperature which is permissible and what load would be considered moderate would help make an actual decision. Present materials usually require from 125°C up for cure and will in general give a bond which is about as strong as that between the glaze and the porcelain. If you can send us some actual parts I think we can make them adhere rather satisfactorily, but whether they will pass your requirements depends on more exact specifications of what these requirements are.



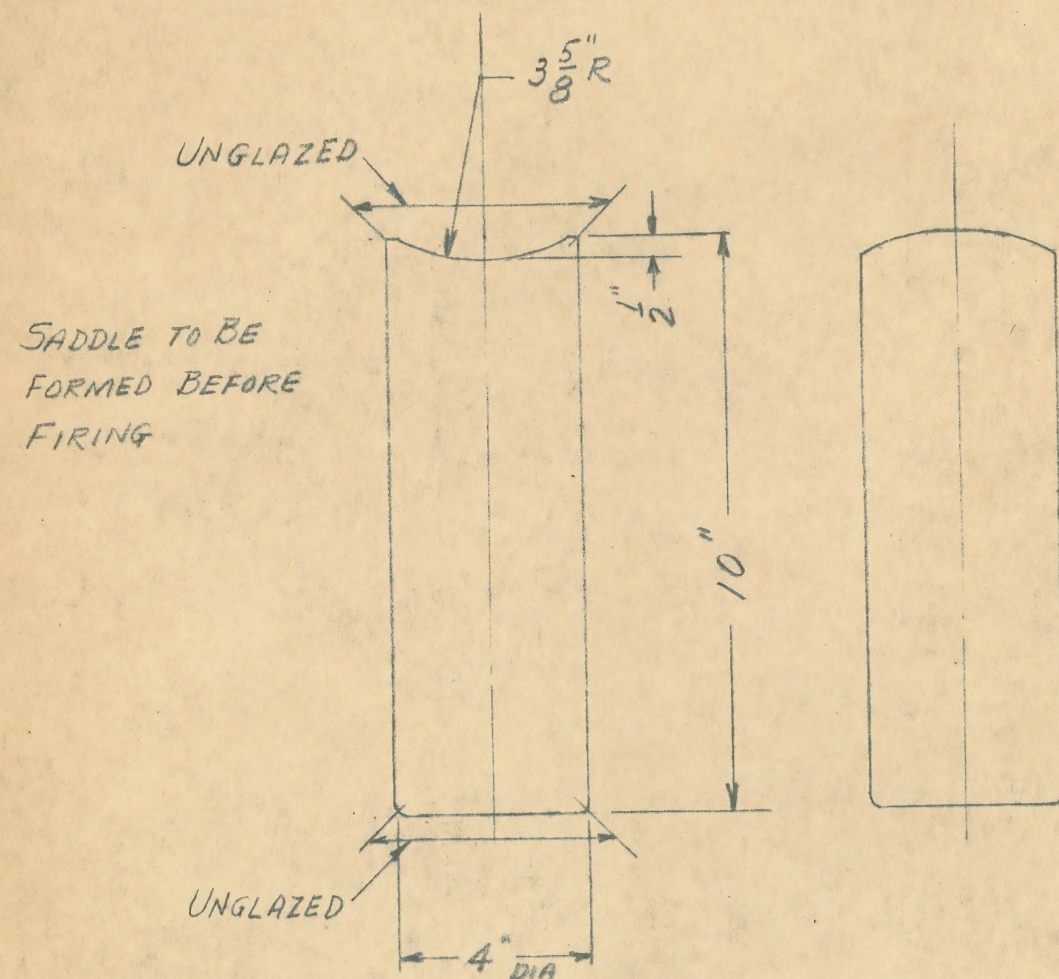
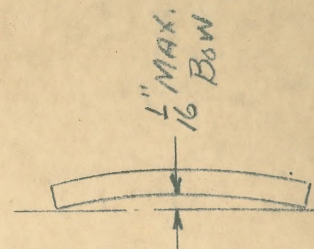
H. Rudoff
GENERAL ENGINEERING LABORATORY
Phone: 3245

HR:mk
CC: CD Doyle- #37 - 273

TUBE, PORC.

ATTENTION!

$\pm \frac{1}{32}$ PER INCH ALLOWED
UNLESS OTHERWISE SPECIFIED



Baltimore,
October 17, 1951

Porcelain to Porcelain Bond

Dr. H. Rudoff
Materials & Process Division
General Engineering Lab.
General Electric Company
Schenectady, New York

I am sending to you by parcel post some small porcelain tubes that can be assembled as per Locke sketch USK-9-10-51. If you would be able to make some sample bonds so that we could test them and if the tests proved successful we could then proceed with a small order of the material so that we could try them on a large scale piece.

I am not giving you any further specifications inasmuch as you have stated that the epoxy resin bond would be "about as strong as that between the glaze and the porcelain". The temperature limitation of 300°F is desirable since porcelain is rather poor in thermal shock resistance. Ideally, we would like to be able to make the bonds at room temperature.

Would you also send me an estimate of the cost of the materials and any other information you deem pertinent.

D. M. Demarest
Supervisor, High Voltage Laboratory

DMD/bk

253

LOCKE INCORPORATED
BALTIMORE, MARYLAND

DWG. DATE OCT. 8, 1951

U-M-57904-B

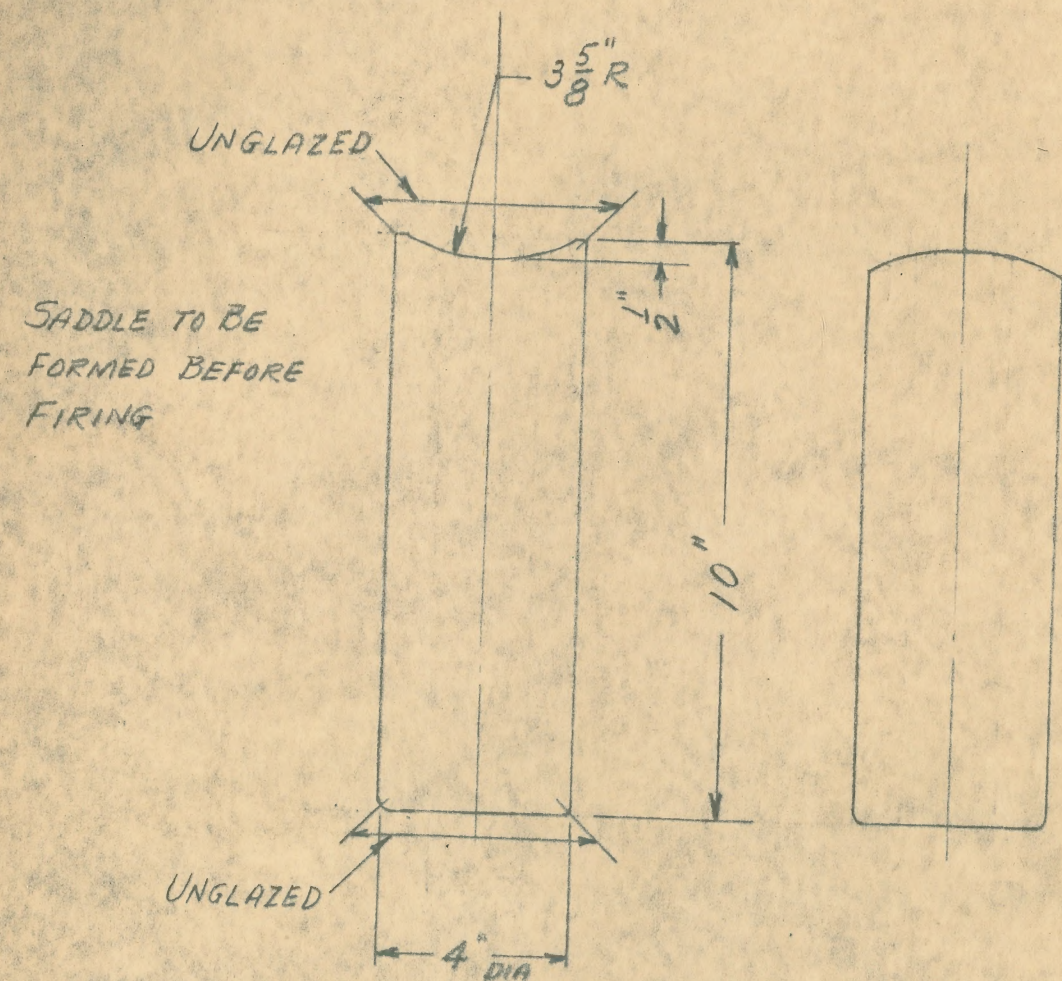
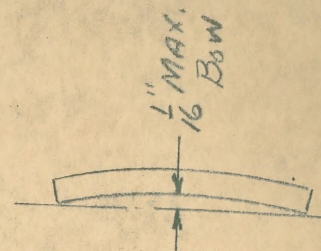
R-282 8-15-51

"ALBANENE" NO. 1951 K&ECO., N.Y.

TUBE, PORC.

ATTENTION!

$\pm \frac{1}{32}$ PER INCH ALLOWED
UNLESS OTHERWISE SPECIFIED



253

LOCKE INCORPORATED
BALTIMORE, MARYLAND

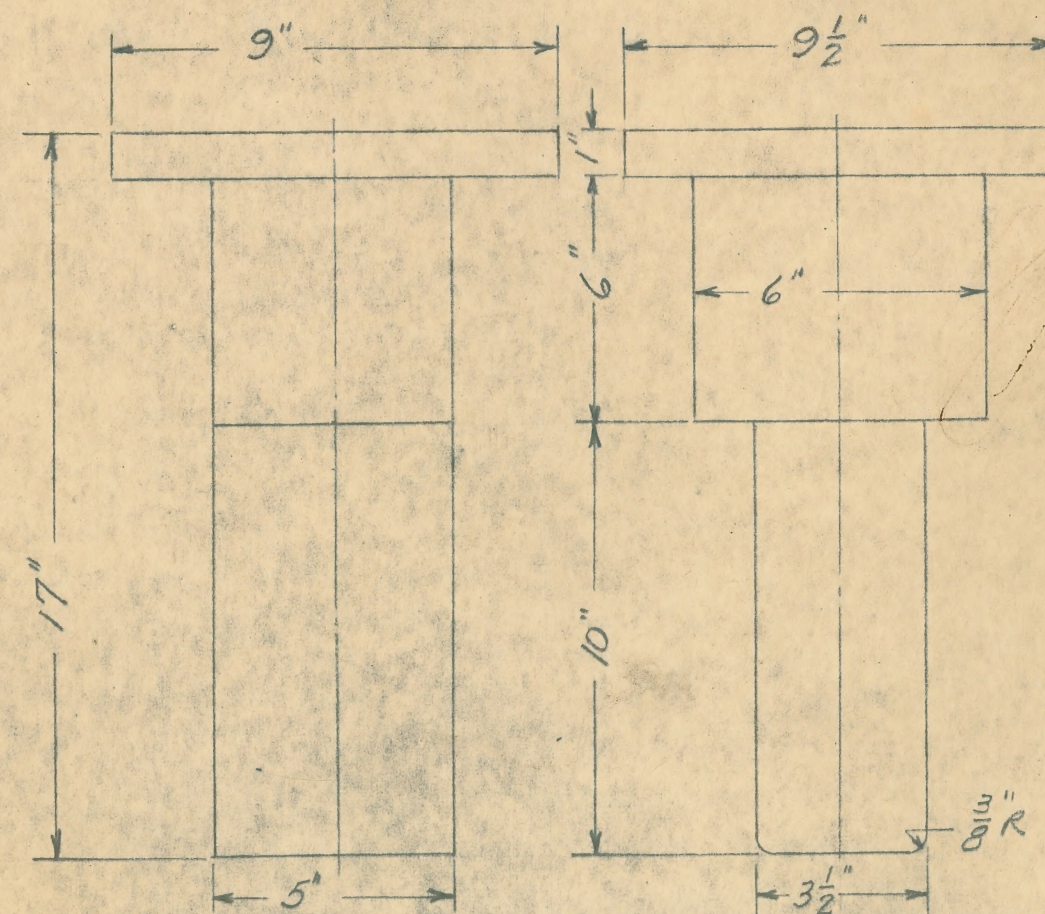
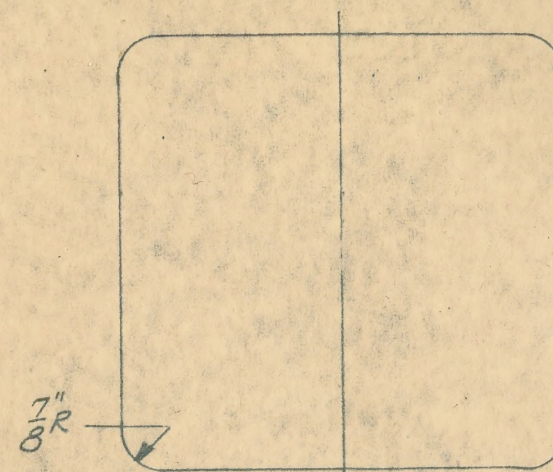
DWG. DATE OCT. 8, 1951

U-M-57904-B

R-282 8-15-51

"ALBANESE" NO. 1951 K & ECO., N.Y.

ADAPTER
STEEL - GALV



LOCKE INSULATOR CORP.
BALTIMORE, MD.

DWG. DATE OCT. 15, 1951

U-M-57904-F

R-282 8-15-51

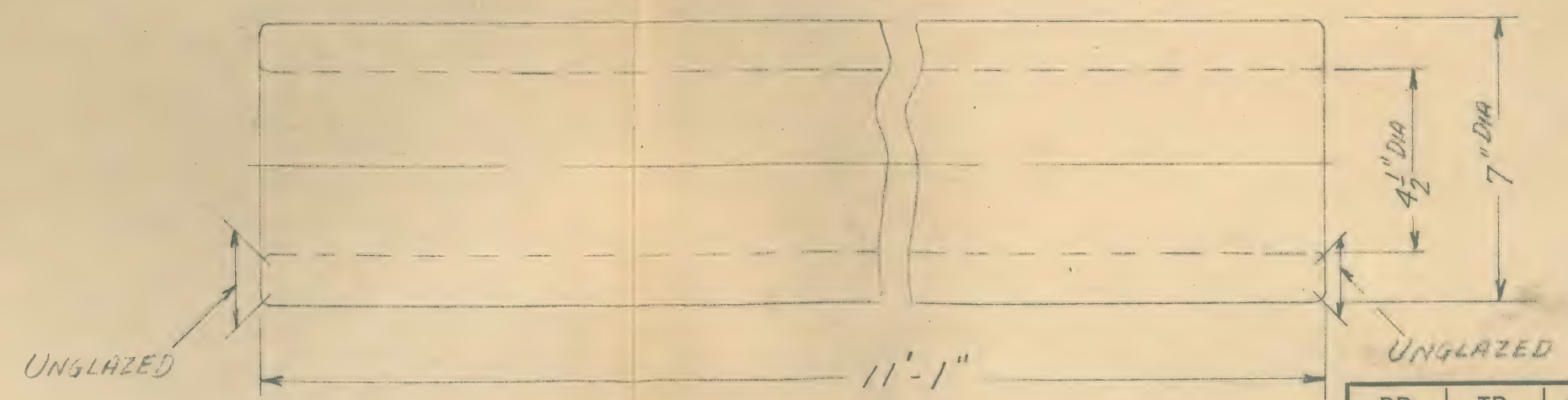
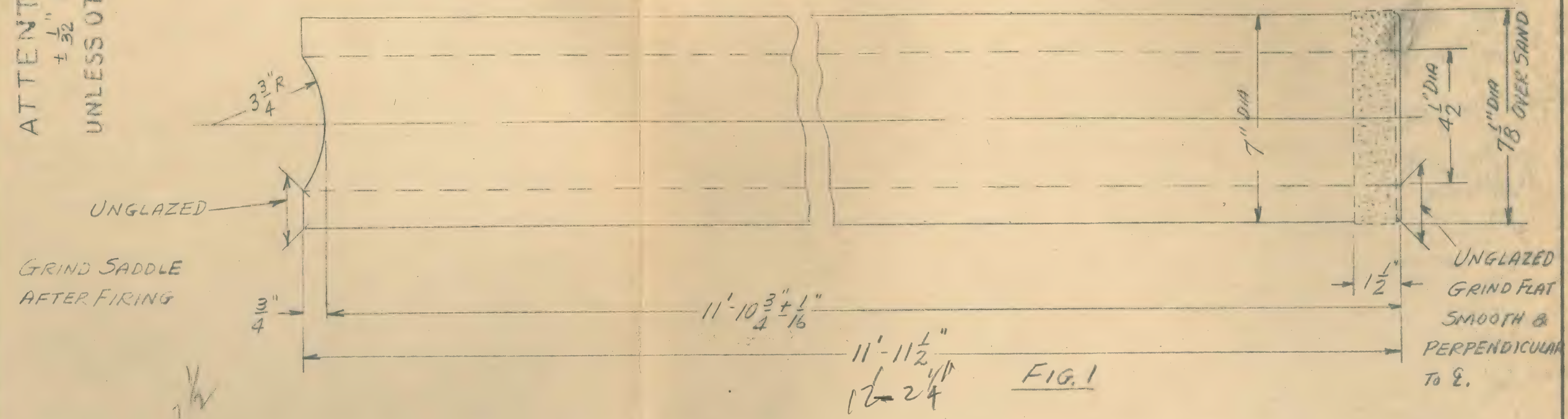
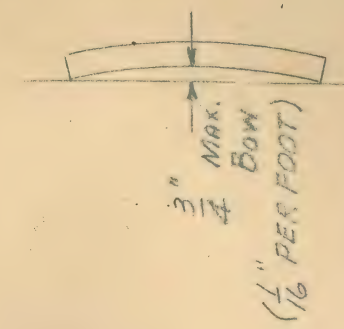
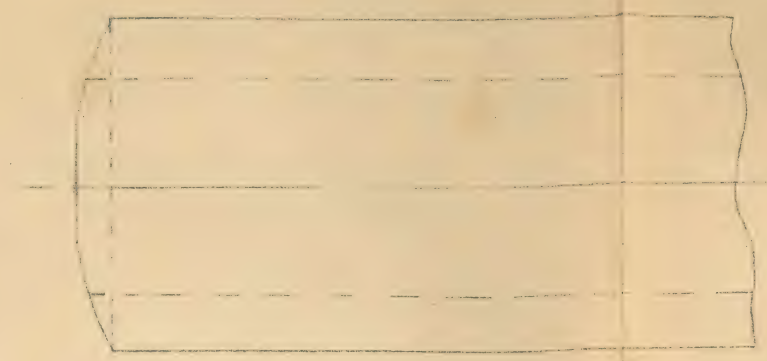
"ALBANESE" NO. 1951 K & ECO., N.Y.
REG. U.S. PAT. OFF.

253

ATTENTION!
 $\pm \frac{1}{32}$ " PER INCH ALLOWED
 UNLESS OTHERWISE SPECIFIED

TUBE, SPHERE GAP SUPPORT

FIG	NO. OR SIZE	MAT'L.	DESCRIPTION
1	57904-A	PORC.	
2	57904-A-1	PORC.	



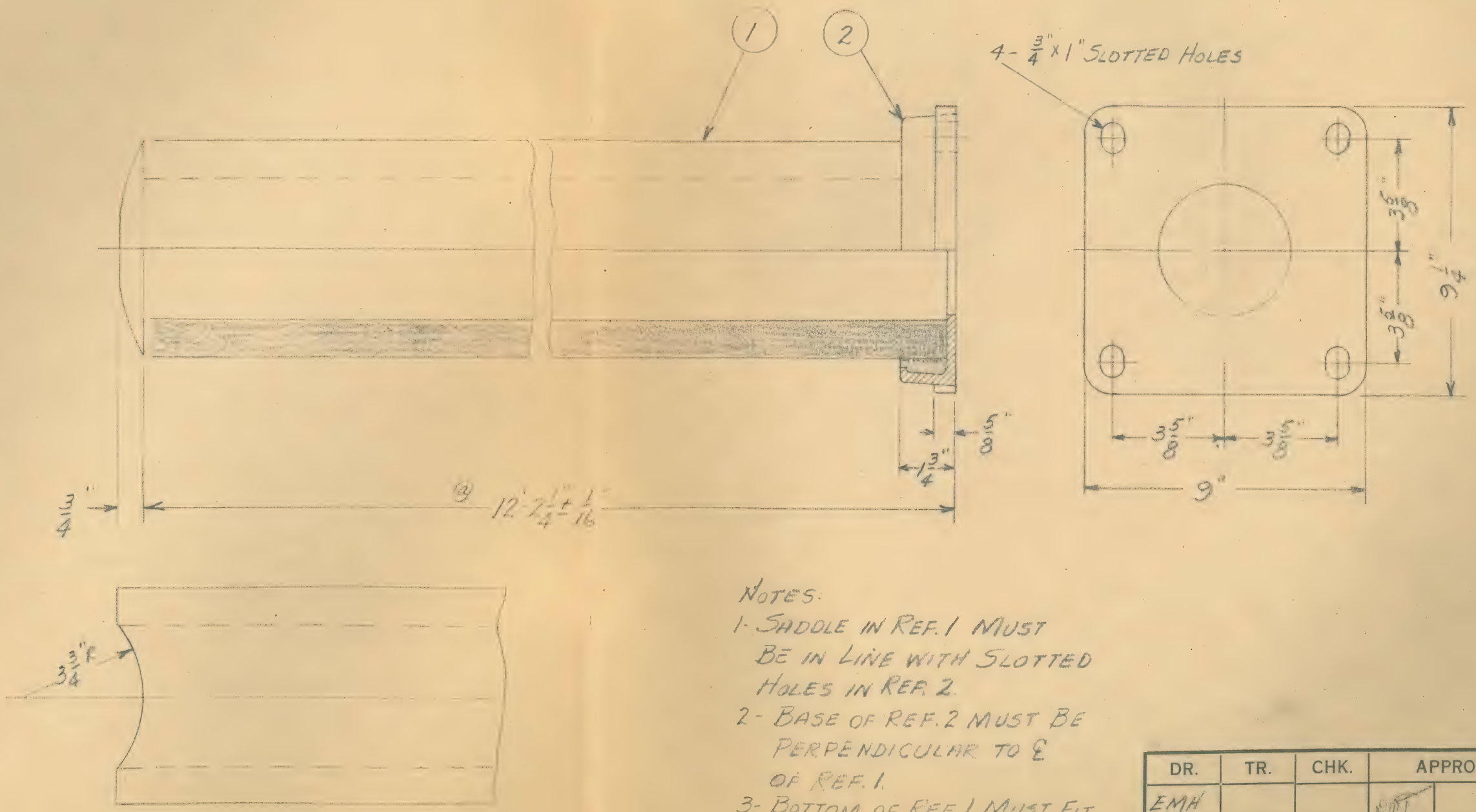
NOTE: -1 MAY BE MADE BY
 GRINDING 57904-A TO LENGTH
 & THUS REMOVING SAND BAND.

DR.	TR.	CHK.	APPROVED
EMH			
LOCKE INCORPORATED			
BALTIMORE, MARYLAND			
DWG. DATE OCT. 8, 1951			
DWG. VM-57904-A			

R-282 8-15-51
 EMH @ WAS 11'-11"
 R-179 5-7-52
 MAY 8, 1952

SIDE SUPPORT, SPHERE GAP

NO REQ	REF	NO. OR SIZE	MAT'L.	DESCRIPTION
1	1	57904-A	PORC	TUBE
1	2	90244	M.I.	FLANGE GALV



- NOTES:
- 1- SADDLE IN REF. 1 MUST BE IN LINE WITH SLOTTED HOLES IN REF. 2.
 - 2- BASE OF REF. 2 MUST BE PERPENDICULAR TO E OF REF. 1.
 - 3- BOTTOM OF REF. 1 MUST FIT SQUARELY AGAINST BASE OF REF. 2 AS SHOWN.

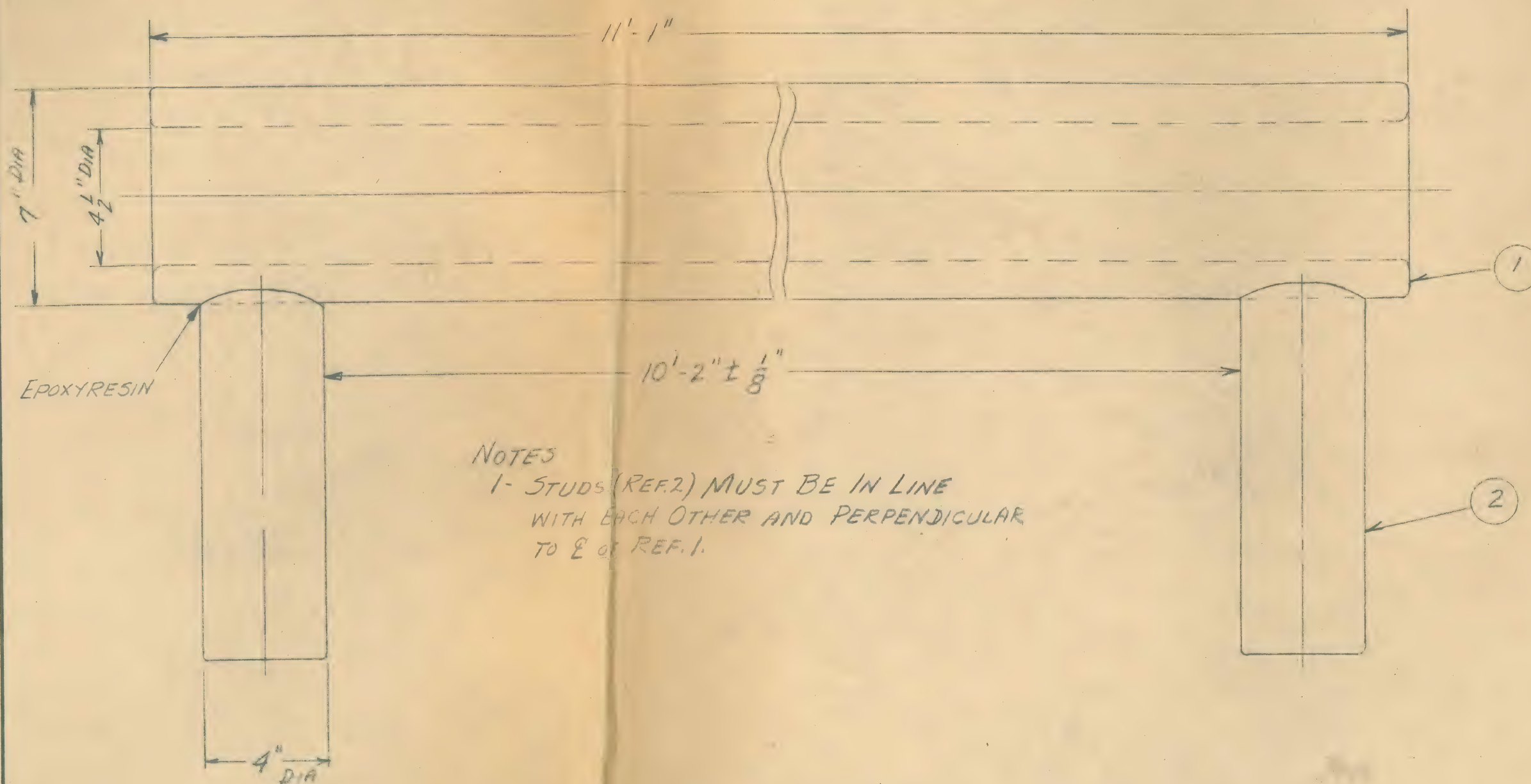
DR.	TR.	CHK.	APPROVED
EMH			
LOCKE INCORPORATED			
BALTIMORE, MARYLAND			
DWG. DATE OCT. 9, 1951			
DWG. VM-57904-AZ			

R-282

8-15-51

TOP, SPHERE GAP SUPPORT

NO. REQ.	REF.	NO. OR SIZE	MAT'L.	DESCRIPTION
1	1	57904-A-1	PORC	
2	2	57904-B	PORC	



NOTES

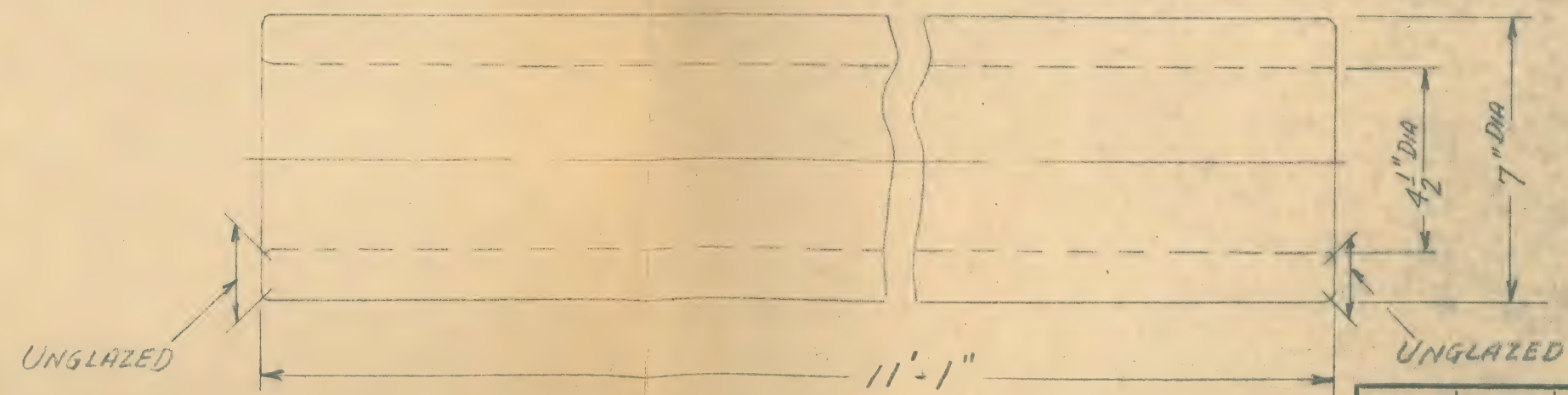
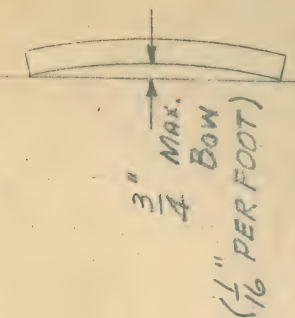
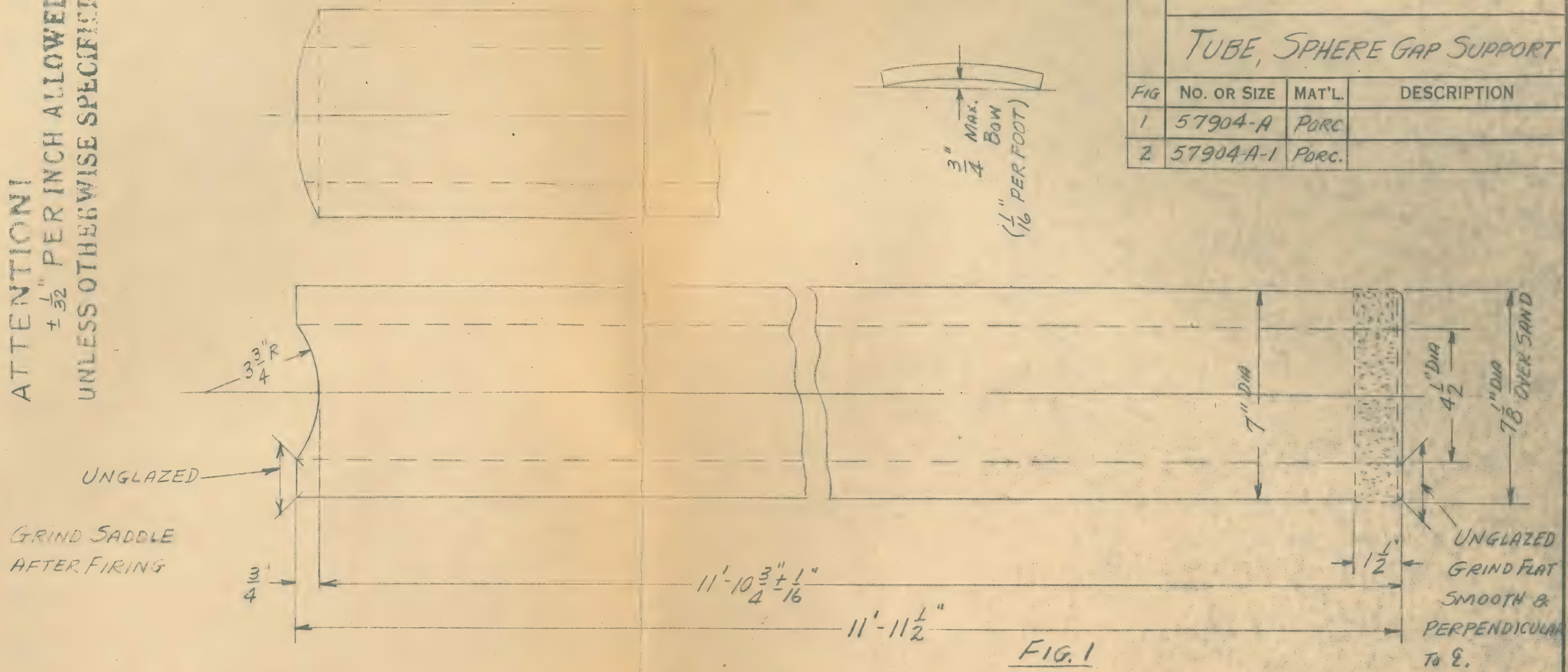
1- STUDS (REF. 2) MUST BE IN LINE
WITH EACH OTHER AND PERPENDICULAR
TO E OF REF. 1.

DR.	TR.	CHK.	APPROVED
EMH			
LOCKE INCORPORATED			
BALTIMORE, MARYLAND			
DWG. DATE OCT. 8, 1951			
DWG. VM-57904-BZ			

ATTENTION!
 $\pm \frac{1}{32}$ " PER INCH ALLOWED
 UNLESS OTHERWISE SPECIFIED

TUBE, SPHERE GAP SUPPORT

FIG	NO. OR SIZE	MAT'L	DESCRIPTION
1	57904-A	PORC	
2	57904-A-1	PORC.	



NOTE: -1 MAY BE MADE BY
 GRINDING 57904-A TO LENGTH
 & THUS REMOVING SAND BAND.

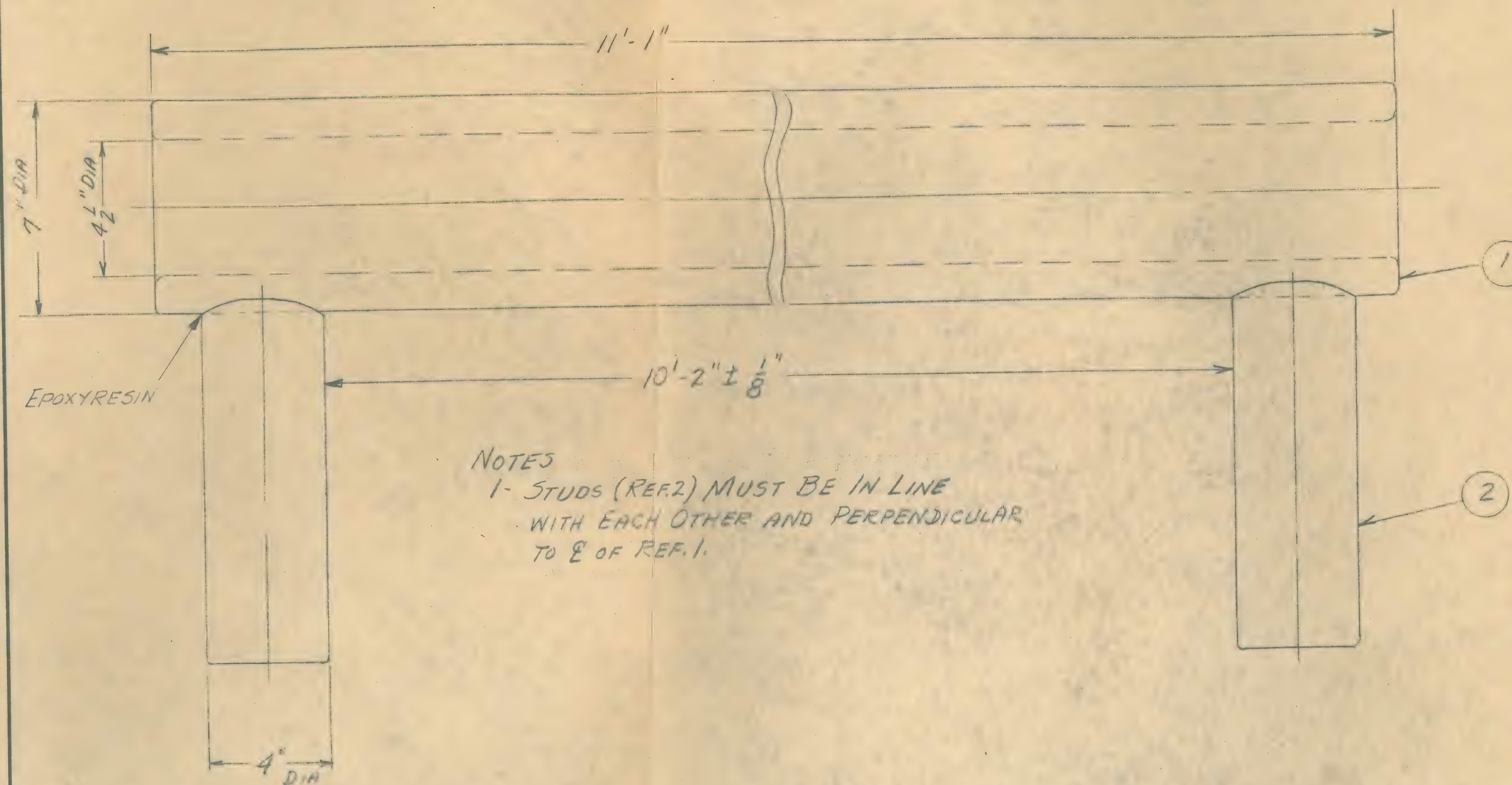
FIG. 2

DR.	TR.	CHK.	APPROVED
EMH			
LOCKE INCORPORATED			
BALTIMORE, MARYLAND			
DWG. DATE OCT. 8, 1951			
DWG. VM-57904-A			

R-282 8-15-51

TOP, SPHERE GAP SUPPORT

NO. REQ	REF	NO. OR SIZE	MAT'L.	DESCRIPTION
1	1	57904-A-1	PORC	
2	2	57904-B	PORC	



NOTES

- 1- STUDS (REF.2) MUST BE IN LINE
WITH EACH OTHER AND PERPENDICULAR
TO E OF REF.1.

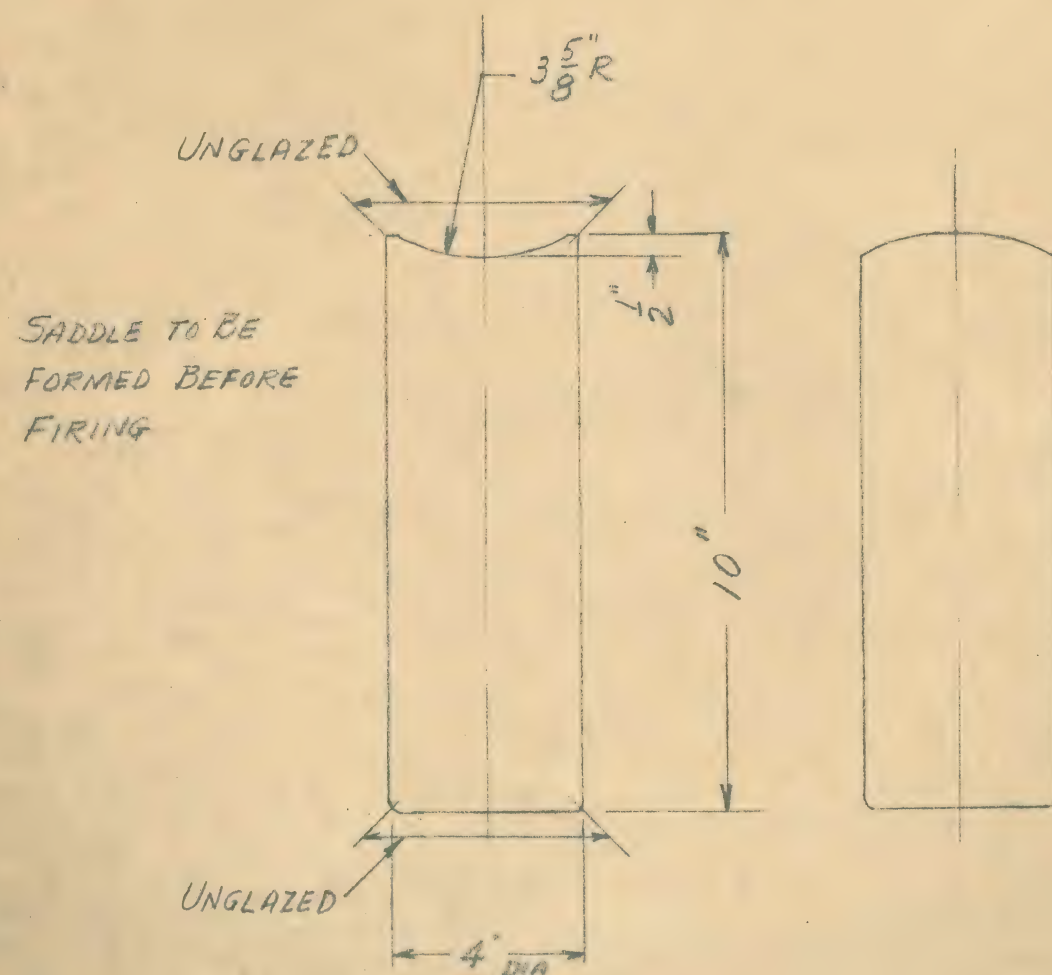
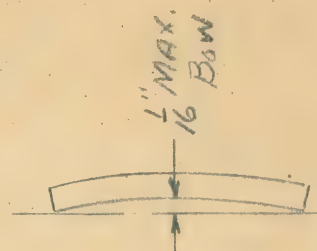
DR.	TR.	CHK.	APPROVED
EMH			

LOCKE INCORPORATED
BALTIMORE, MARYLAND
DWG. DATE OCT. 8, 1951
DWG. VM-57904-BZ

TUBE, PORC.

ATTENTION!

$\pm \frac{1}{32}$ PER INCH ALLOWED
UNLESS OTHERWISE SPECIFIED



PN-205 (3-50)

COPY for

GENERAL ELECTRIC
COMPANY

To: MR. DON DEMAREST

May 22, 1952

The Locke Department of
General Electric Company
Post Office Box 57
Baltimore-3, Maryland

Attention: Mr. W. Winkler

Subject: Your Order 13083
Our Reqn. BAL-24649

Gentlemen:

Confirming Mr. Chaney's telephone conversation of today, please be informed that the malleable iron base which you originally ordered would be priced at \$18.25 each less 10%, (material not supplied) but the substituted bronze bases which we shipped on 4/2/52 was priced at \$16.00 less 10%. Therefore, from a previously mentioned figure, you can plainly see that there will not be any adjustment made if you keep these bronze bases in substitute of the malleable iron bases.

Unless we hear from you stating that the bronze type bases are not acceptable, we will consider this matter closed.

Very truly yours,

W. T. WINTER
ORDER SERVICE DIVISION

WTW:ST:PH

253

LOCKE INCORPORATED
BALTIMORE, MARYLAND

DWG. DATE OCT. 8, 1951

U-M-57904-B

Locke

Est-3847

SPHERE GAR FRAME for (Mt. Venable) (from layout)

PORC. TUBE

Orig Size 4 1/4 x 7 x 158 (1/8 SCALE)

Orig	B-1	1.30
Grind 25%		.33
Shrink on Weld	-	.60
Polish Head	-	.50
Fin Insp. 83 40-2		2.30
		5.03
Shy Insp 15%		.25
Inspect		.50
1/8 x Grind		2.80
		9.08
L.A. 5%		.45
		9.53
S.V. 15%		1.44
		10.97
2 W/E 165%		18.10
		29.07
Watt 350 #		10.85
Fin 12 PERIODIC K/LN		226.00
Orig (SPEC)		1.25
		267.17
Ed Insp 15%		40.08
		307.25
		each

3-PS

921.75

Mach Cpt	③	.20
2 W/E 150%		.30
Watt		.58
		1.08

16 RECD.
TOTAL 17.25

Est/a	④	.15
32 RECD.		
TOTAL		4.80

Mach Cpt	⑤	1.70
S.V. 10%		.17
		1.87
2 W/E 150%		2.81
		4.68
Watt		20.00
		24.68

2 RECD.
TOTAL 49.36

Mach Cpt	⑥⑦	1.60
S.V. 10		.16
		1.76
2 W/E 150		2.64
		4.40
Watt 2 RECD.		10.00
		14.40

2 RECD.
TOTAL 28.80

2 ITEMS 57.60

FLANGE ⑧
FROM COST
9.95

2 RECD
18.90

Est/a ⑨
5 RECD
TOTAL .80

Est/a ⑩
5 RECD
TOTAL .80

Est/a ⑪
7 RECD
20.00

Asm Cap-Tube 380 each
Clean 2.80

L.A. 5% 6.00
S.V. 2% 30
6.30

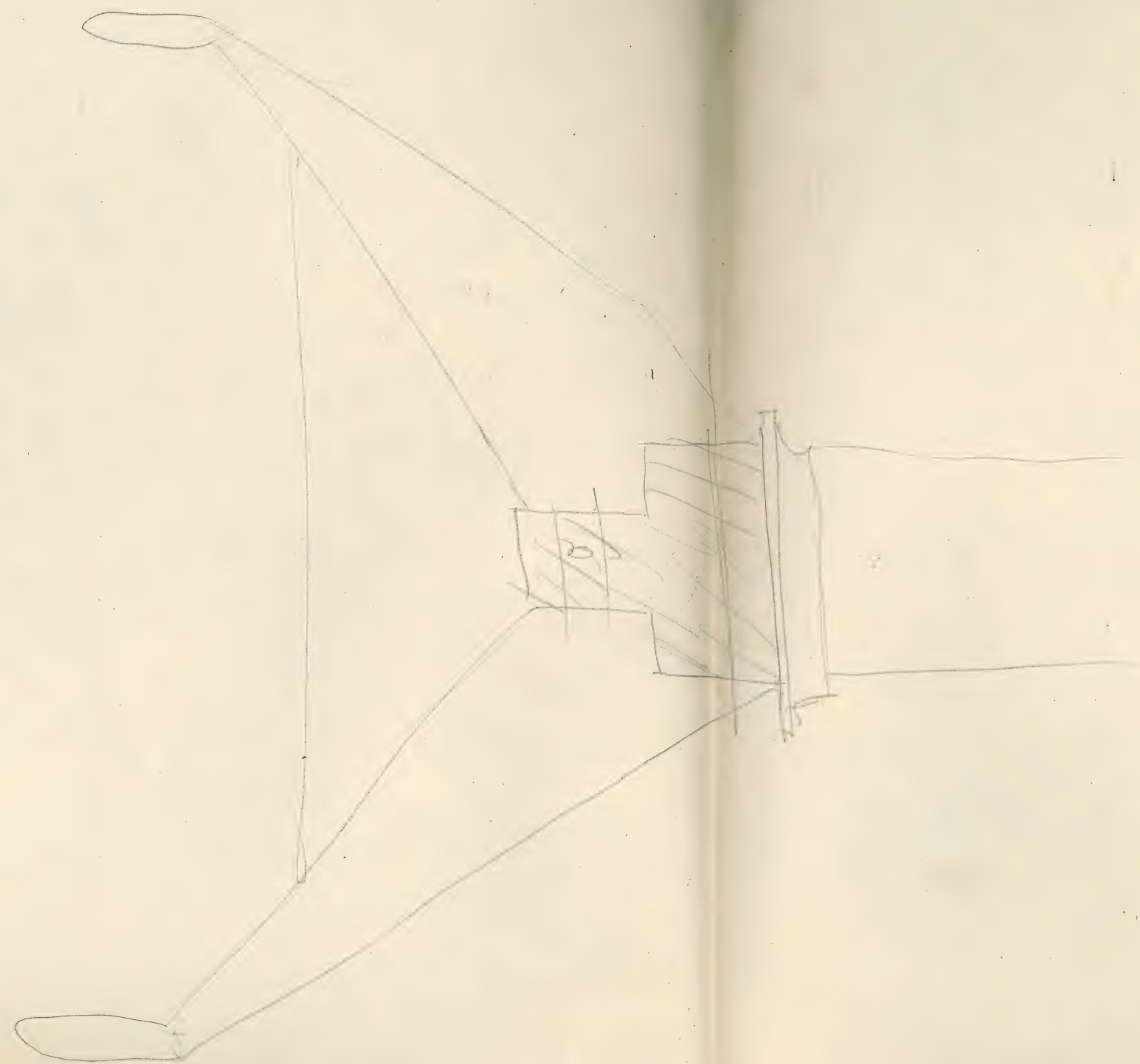
2 W/E 175 6.43
Watt 11.27
1.00

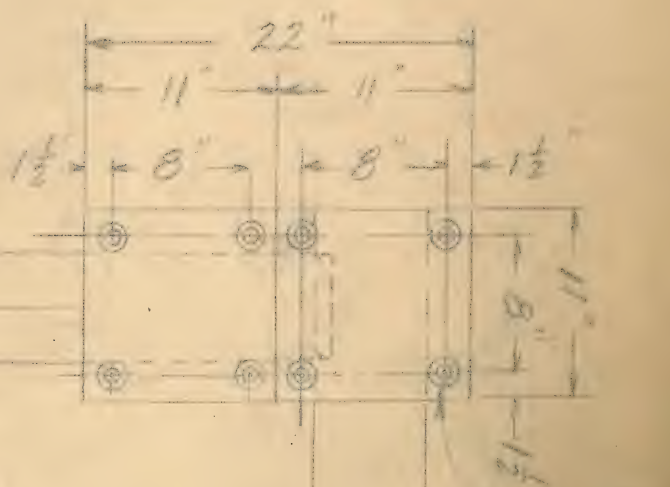
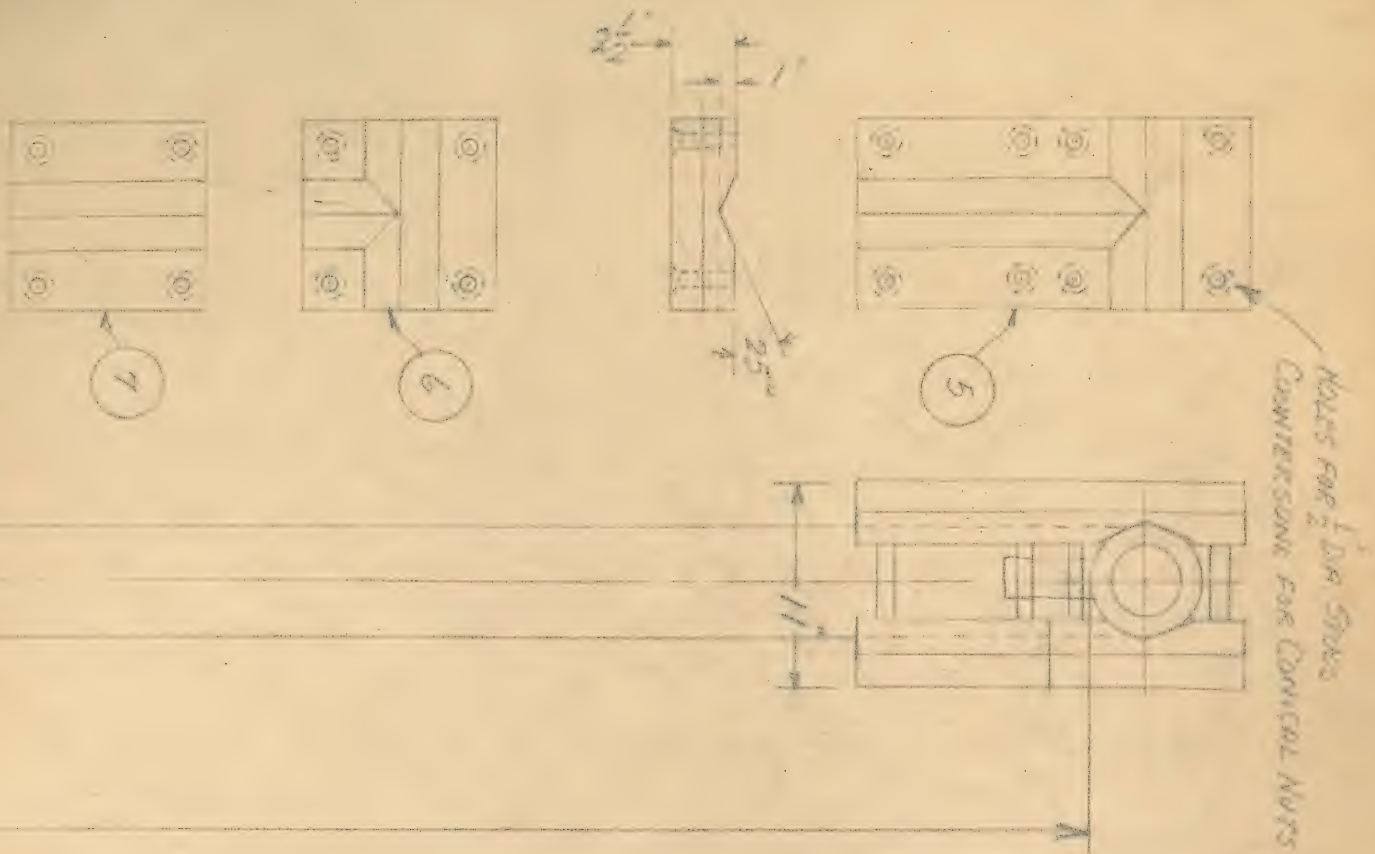
18.70 each
2 X
TOTAL 37.40

Asm	37.40
1+2	921.75
3	17.25
4	4.80
5	49.36
6+7	57.60
8	18.70
9	.80
10	.80
11	20.00

10% Var.
1128.49
112.84
1241.33

N. J. Gower
8/17/51





1 PORG. TUBES
GLAZED INSIDE
& OUT. GRIND
SMOOTH END 1.002
GRIND SMOOTH
OTHER END (SEE DETAIL
OF TUBE) AFTER FINISH

2 11/4

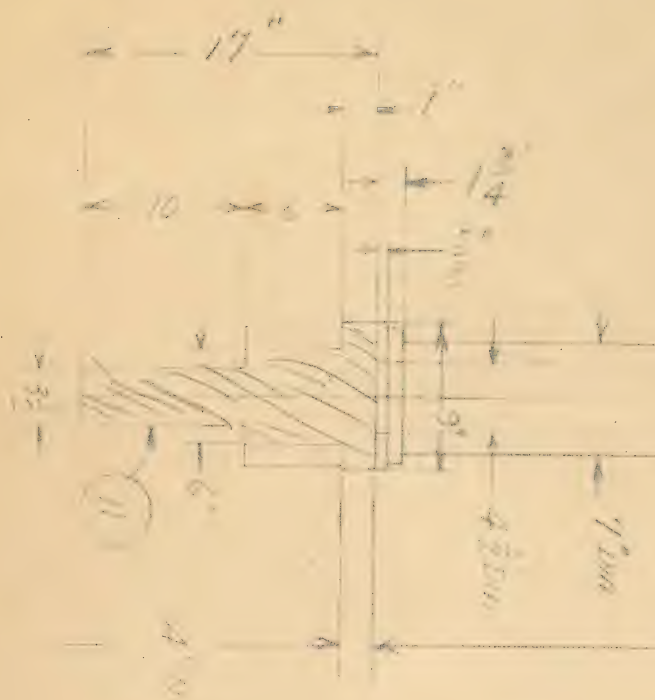
3 1/2
4 SWICH

15 DIA. 1/4 DIA
1/4 DIA. 1/4 DIA

11-11

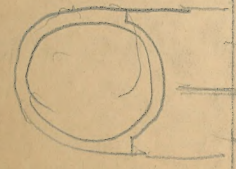
29/0

8-11



9 1/2
10 1/2

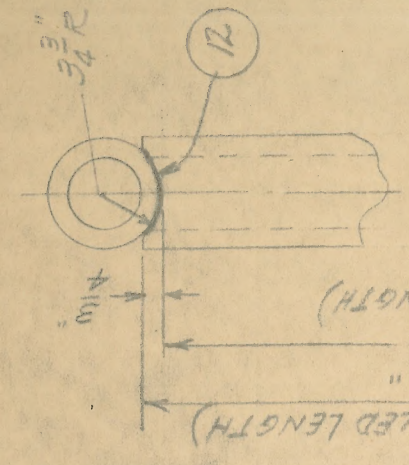
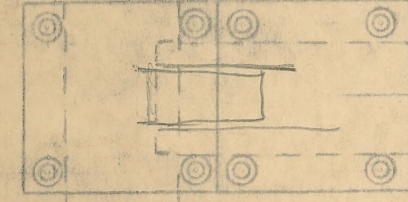
8 90244 PLANGE N/A



260

" PORC. TUBE
ED INSIDE & OUT
E AS VERTICAL TUBES
PT ONLY GRINDING
URED IS TO REMOVE
ND BAND & OBTAIN LENGTH

200



(ASSEMBLED LENGTH)

11'-11" $\pm \frac{1}{16}$ "

11'-11 3/4" (ASSEMBLED LENGTH)

DETAIL OF
TOP OF PORC. TUBE

BILL OF MATERIAL	
No. REF.	DESCRIPTION
2	1 TUBE, PORC.
1	2 TUBE, PORC.
16	3 STUD, 1/2" x 14" LG., NON-MET.
32	4 CONICAL NUT, 1/2", NON-MET.
2	5 CLAMP, NON-METALLIC
2	6 " " "
2	7 " " "
2	8 FLANGE, 90244, M1 GALV
8	9 HEX. HD. CAPSCREW, ST GALV
8	10 LOCK WASHER, 5/8", ST GALV
2	11 SUPPORT PLATES, ST GALV
X	12 PADDING, ASPH. FELT, 1"

12'-0"

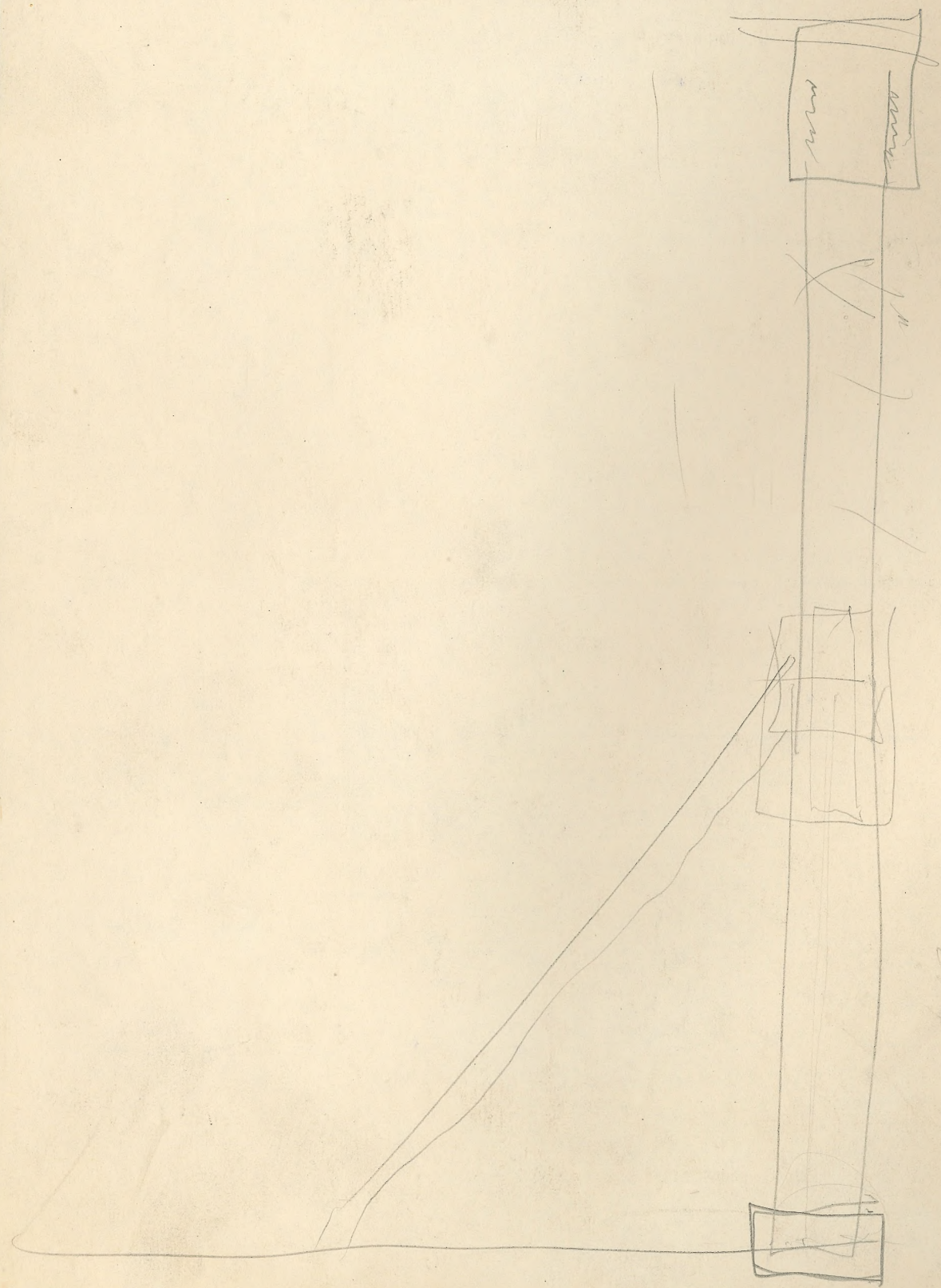
11'-1"

10'-6"

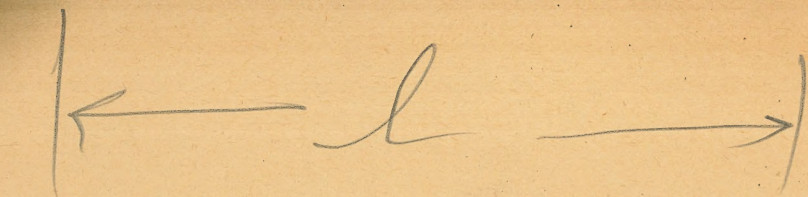
11'-0"

P 292 815-51

10/11/51

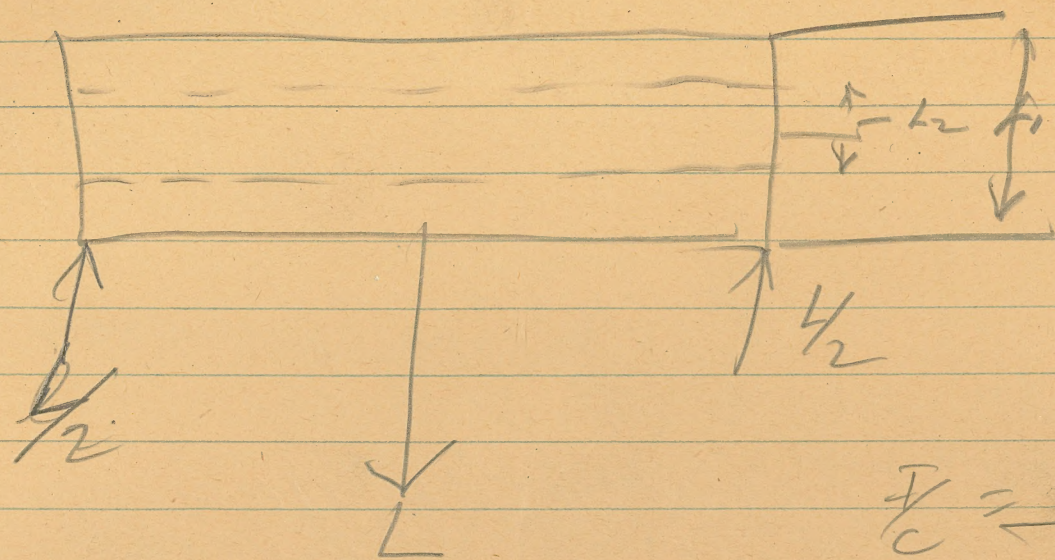


2.4



$$h_1 = 3.5''$$

$$h_2 = 2.25''$$



$$\frac{T}{C} = \frac{\pi (113.89)}{3.5}$$

$$S = \frac{M c}{I}$$

$$M = \frac{S I}{c}$$

$$\frac{L l}{2} = \frac{S I c}{I}$$

$$L = \frac{4 S T c}{l}$$

$$L = \frac{4 S \pi (h_1^4 - h_2^4)}{l h_1}$$

$$h_1^4 = 149.50$$

$$h_2^4 = 25.61$$

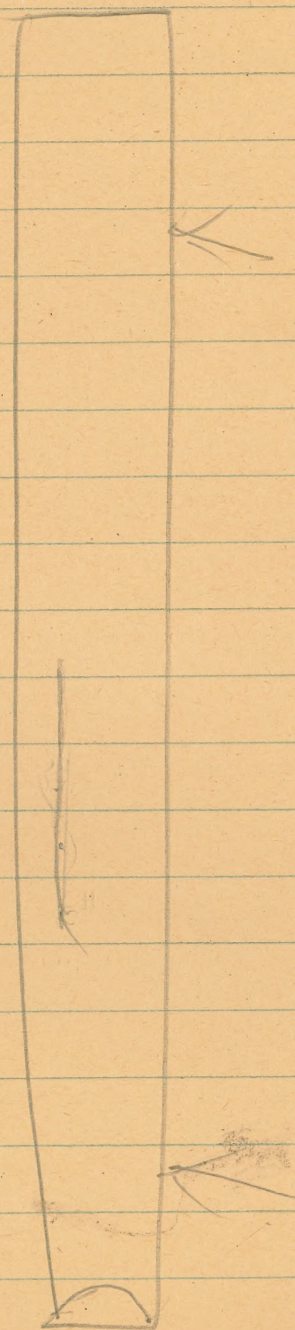
$$(h_1^4 - h_2^4) = 113.89$$

$$A = \frac{4 \pi (h_1^4 - h_2^4)}{h_1} = \frac{4 \pi (113.89)}{3.5} = \frac{409.102}{1}$$

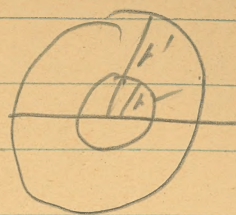
$$L = \frac{S K}{l} = \frac{1500 \cdot 102}{12} = 2100$$

$$I = \frac{\pi (h_1^4 - h_2^4)}{4}$$

T



$$I = \frac{m (t_1^2 + t_2^2)}{2}$$



$$m = \frac{I}{\frac{1}{2} (t_1^2 + t_2^2)}$$

$$\frac{I}{C} = \frac{\frac{1}{2} \frac{113.89}{3.5}}{\frac{102}{4}} = 25$$

$$S = \frac{Ll}{102} = 27$$

$$L = \frac{S \cdot 102}{2 - 144} = 3000$$

$$.098 \text{ (}$$